

Cryptosporidiosis (*Cryptosporidium parvum*)

December-2003

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Cryptosporidium parvum, a coccidian protozoan, is associated with human infection and was not recognized as a cause of human illness until 1976.

B. Clinical Description and Laboratory Diagnosis

The most common symptom of cryptosporidiosis is profuse and watery diarrhea. Other signs and symptoms include weight loss, stomach cramps, nausea, vomiting, and low-grade fever. Symptoms often wax and wane, but remit in fewer than 30 days in most immunocompetent people. Immunodeficiency, especially in HIV infection, is associated with an inability to clear the parasite, and the disease may have a prolonged and fulminant clinical course, contributing to death. Asymptomatic infections are common and serve as a source of infection for others.

Laboratory diagnosis is generally made by the identification of oocysts in fecal smears. Organisms can also be identified in intestinal biopsy tissue. In addition, new and more sensitive enzyme linked immunosorbent assay (ELISA) tests have recently become available.

C. Reservoirs

Humans, cattle and other domestic and wild animals are reservoirs.

D. Modes of Transmission

Infected animals and people excrete large numbers of oocysts in stool. The infectious dose can be very low. Oocysts are relatively hardy and can survive in the environment for weeks or months. They are resistant to concentrations of chlorine and other disinfectants commonly used for drinking water treatment. They can be killed by heat or removed from water by adequate filtration or other methods. The most common mode of transmission is person-to-person. Persons become infected by hand-to-mouth transfer of oocysts from the feces of an infected individual, especially in institutions and daycare centers. Transmission can also occur person-to-person through certain types of sexual contact (e.g., oral-anal contact). Outbreaks traced to contaminated drinking water have been reported, including an outbreak in Milwaukee that reportedly affected 400,000 people. Localized outbreaks may occur from the ingestion of fecally contaminated recreational waters, such as streams or lakes, swimming pools or water parks, which are open to contamination by human and animal feces. Outbreaks have also occurred from eating food contaminated by animal feces (e.g., unpasteurized apple cider). Infected food workers have also been the source for foodborne transmission in a few cases. In addition, zoonotic transmission can occur through contact with feces from infected animals (e.g., livestock handlers, dairy farmers, veterinarians).

E. Incubation Period

The incubation period ranges from 1 to 12 days, with an average of about 6-7 days.

F. Period of Communicability or Infectious Period

The disease is communicable for as long as the infected person excretes *Cryptosporidium* oocysts, which generally begins at the onset of symptoms. Oocysts may be excreted in the stool for several weeks after symptoms subside, and they can remain infective outside the body for two to six months in a moist environment.

G. Epidemiology

Cryptosporidiosis has a worldwide distribution. In developed countries, studies have shown the prevalence of infection to range from < 1% to 4.5% in individuals surveyed by stool examination. The prevalence is significantly higher in developing regions of the world. Cryptosporidiosis is among the most common causes of persistent diarrhea in patients with AIDS in the United States. Children under two years of age, animal handlers, travelers to endemic areas, men who have sex with men, and close contacts of infected individuals are those most likely to be infected. Outbreaks have been reported in daycare centers and have been associated with public drinking water; swimming in contaminated pools, water parks, lakes and ponds; and drinking unpasteurized cider made from apples contaminated with cow manure. It is estimated that 50% of dairy calves may shed oocysts and that the parasite is present in >90% of dairy farms. In New Jersey, an average of 29 cases of cryptosporidiosis are reported annually to NJDHSS.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

CASE CLASSIFICATION

A. CONFIRMED

- Demonstration of *Cryptosporidium* oocyst in stool, **OR**
- Demonstration of *Cryptosporidium* in intestinal fluid or biopsy specimen, **OR**
- Demonstration of *Cryptosporidium* antigen in the stool by immunofluorescence (IF) or enzyme-linked immunoassays (ELISA).

B. PROBABLE

A clinically compatible case that is epidemiologically linked to a confirmed case by the NJDHSS.

C. POSSIBLE

Not used.

Note: See Section 3 C below for information on how to report a case.

B. Laboratory Testing Services Available

The Public Health and Environmental Laboratories (PHEL) provide testing for *Cryptosporidium parvum* on formalinized fecal material using an acid-fast stain to identify the presence of oocysts. There is no charge for analysis performed on outbreak-associated samples approved through the Infectious and Zoonotic Diseases Program (IZDP) or other local health department investigations. However, non-outbreak related samples received will incur a \$5 fee for service. Additional information regarding this testing may be obtained by calling the Enteric Laboratory at 609.292.7368.

The mailing address of PHEL is:

NJDHSS

Division of Public Health and Environmental Laboratories

Specimen Receiving and Records

P.O. Box 361

John Fitch Plaza, Trenton, NJ 08625- 0361.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify whether the case may be a source of infection for other persons (*e.g.*, a diapered child, daycare attendee or foodhandler) and if so, to prevent further transmission.
- To identify transmission sources of public health concern (*e.g.*, a contaminated public water supply) and to stop transmission from such a source.

B. Laboratory and Healthcare Provider Reporting Requirements

N.J.A.C. 8:57-1.8 stipulates that laboratories and health care providers report (by telephone, confidential fax, over the Internet using the Communicable Disease Reporting System [CDRS] or in writing) all cases of cryptosporidiosis to the local health officer having jurisdiction over the locality in which the patient lives, or, if unknown, to the health officer in whose jurisdiction the health care provider requesting the laboratory examination is located.

C. Local Board of Health Reporting and Follow-Up Responsibilities

1. Reporting Requirements

The New Jersey Administrative Code (N.J.A.C. 8:57-1.8) stipulates that each local health officer must report the occurrence of any case of cryptosporidiosis, as defined by the reporting criteria in Section 2 A above using the [CDS-1](#) form. A report can be filed electronically over the Internet using the confidential and secure CDRS.

2. Case Investigation

- a. It is the local health officer's responsibility to complete the [CDS-1](#) reporting form by interviewing the patient and others who may be able to provide pertinent information. Much of the information on the form can be obtained from the patient's healthcare provider or the medical record.
- b. Use the following guidelines to complete the form:
 - 1) Accurately record the demographic information, date of symptom onset, symptoms, and medical information.
 - 2) When asking about exposure history (food, travel, activities, etc.), use the incubation period range for cryptosporidiosis (1–12 days). Specifically, focus on the period beginning a minimum of 1 day prior to the case's onset date back to 12 days before onset.
 - 3) If possible, record any restaurants or social gatherings at which the patient ate, including food item(s) and date consumed.
 - 4) Ask questions about travel history and outdoor activities to help identify potential source where the patient became infected.
 - 5) Ask questions about water supply and exposure because cryptosporidiosis may be acquired through water consumption.
 - 6) Ask questions about household/close contact, pet or other animal contact.
 - 7) Determine whether the patient attends or works at a daycare facility and/or is a food handler.
 - 8) If there have been several unsuccessful attempts to obtain patient information (*e.g.*, the patient or healthcare provider does not return calls or respond to a letter, or the patient refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as possible. Please note on the form the reason why it could not be filled out completely.
 - 9) **If CDRS is used to report the case, the exposure, travel, employment and contact information can be recorded in the "Comments" section.**

After completing the form, it should be mailed (in an envelope marked "Confidential") to the NJDHSS IZDP, or the report can be filed electronically over the Internet using the confidential and secure CDRS. The mailing address is:

NJDHSS
Division of Epidemiology, Environmental and Occupational Health
Infectious and Zoonotic Diseases Program
P.O.Box 369
Trenton, NJ 08625-0369

- c. Institution of disease control measures is an integral part of case investigations. It is the health officer's responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4, "Controlling Further Spread."

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (N.J.A.C. 8:57-1.12)

Foodhandlers with cryptosporidiosis must be excluded from work.

Note: a case of cryptosporidiosis is defined by the reporting criteria in Section 2 A of this chapter.

Minimum Period of Isolation of Patient

After diarrhea has resolved, foodhandling facility employees may only return to work after producing **one (1)** negative stool specimen. **In outbreak circumstances, a second consecutive negative stool specimen (submitted no less than 24 hours apart) will be required prior to returning to work.**

Minimum Period of Quarantine of Contacts

Contacts with diarrhea who are foodhandling employees or provide patient care or children care shall be considered the same as cases and handled in the same fashion. No restrictions are needed otherwise.

Note: a foodhandler is any person directly preparing or handling food.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Daycare

Since cryptosporidiosis may be transmitted person-to-person through fecal-oral transmission, it is important to follow up on cases of cryptosporidiosis in a daycare setting carefully. General recommendations include:

- Children with cryptosporidiosis who have diarrhea should be excluded until their diarrhea is resolved.
- Children with cryptosporidiosis who have no diarrhea and are not otherwise ill may remain in the program if special precautions (see section 4D).
- Since most staff in child care programs are foodhandlers, those with *Cryptosporidium* in their stools (symptomatic or not) can remain on site but must not prepare food or feed children until their diarrhea has resolved and they have **one (1)** negative stool specimen.

School

Since cryptosporidiosis may be transmitted person-to-person through fecal-oral transmission, it is important to follow up on cases of cryptosporidiosis in a school setting carefully. General recommendations include:

- Students or staff with cryptosporidiosis who have diarrhea should be excluded until their diarrhea has resolved.
- Students or staff with cryptosporidiosis, who do not handle food, have no diarrhea or have mild diarrhea and are not otherwise sick, may remain in school if special precautions are taken.

- Students or staff who handle food and have *Cryptosporidium* infection (symptomatic or not) must not prepare food until their diarrhea has resolved and they have **one (1)** negative stool test.

Community Residential Programs

Actions taken in response to a case of cryptosporidiosis in a community residential program will depend on the type of program and the level of functioning of the residents. In addition to reporting the outbreak to the Local Health Department, facility management should also report any such outbreak to the Division of Long-Term Care Compliance and Surveillance Program of the NJDHSS by phone at 1.800.792.9770 or fax at 609.633.9060. A written report should be mailed within 72 hours to the NJDHSS, Long-Term Care Compliance and Surveillance Program, P.O. Box 367, Trenton, NJ 08625. The NJDHSS considers an event to be an “outbreak” if the infectious disease affects 10% of the population, either on one floor, a unit or total capacity of the facility, or there are three (3) cases of similar symptoms within a 48-hour period.

In long-term care facilities, residents with cryptosporidiosis should be placed on standard (including enteric) precautions until their symptoms subside, and they have **one (1)** negative test for *Cryptosporidium*. Staff members who give direct patient care (e.g., feed patients, give mouth or denture care, or give medications) are considered foodhandlers and are subject to foodhandler restrictions (see Section 4 A above). In addition, staff members with cryptosporidiosis who are not foodhandlers should not work until their diarrhea has resolved.

In residential facilities for the developmentally disabled, staff and clients with cryptosporidiosis must refrain from handling or preparing food for other residents until their diarrhea has subsided, and they have **one (1)** negative stool test for *Cryptosporidium*. In addition, staff members with cryptosporidiosis who are not foodhandlers should not work until their diarrhea has resolved.

Reported Incidence Is Higher than Usual/Outbreak Suspected

If the number of reported cases of cryptosporidiosis in a city/town is higher than usual, or if an outbreak is suspected, investigate to determine the source of infection and mode of transmission. A common vehicle (such as water or food, or association with a daycare center) should be determined, and applicable preventive or control measures should be instituted. If you suspect that the patient became infected through food consumption, use the [Patient Food History Listing](#), [Patient Symptoms Line Listing](#) and [Food-Specific Attack Rate Table Worksheet](#) forms to facilitate recording additional information. Control of person-to-person transmission requires special emphasis on personal hygiene and sanitary disposal of feces. Consult with the NJDHSS IZDP. The IZDP staff can help determine a course of action to prevent further cases and can perform surveillance for patients that may cross several jurisdictions and therefore be difficult to identify at a local level.

D. Preventive Measures

Personal Preventive Measures/Education

To avoid exposure, recommend that individuals:

- Always wash their hands thoroughly with soap and water before handling food or eating, after using the toilet or changing diapers, and after contact with animals, especially cattle.
- After changing diapers, wash the child’s hands as well as their own.
- Avoid drinking raw milk, other unpasteurized dairy products, or unpasteurized apple cider.
- Dispose of feces in a sanitary manner, especially in daycare centers or other institutional settings.
- Avoid drinking water from streams or lakes. Avoid drinking unboiled water while traveling in developing countries or whenever the water quality is unknown. Bringing water to a full, rolling boil for one minute is sufficient to kill *Cryptosporidium*.
- Adhere to local advisories to boil water.

The likelihood that *Cryptosporidium* could cause illness in regulated, public drinking water is low.

Immunocompromised individuals, however, may want to consider the following recommendations:

- Avoid fecal contact.

- Avoid sexual practices that may involve direct contact with feces. Latex barrier protection should be emphasized as a way to prevent the spread of cryptosporidium to sexual partners as well as being a way to prevent the exposure to and transmission of other pathogens.
- Boil tap water before drinking or making ice cubes.
- Consider the use of a home water filtering system with a very fine filter (absolute pore size of one micron or smaller). Such filters include: reverse-osmosis filters; filters labeled as “absolute” 1 micron filters; and those labeled as meeting National Sanitation Foundation standard #53 for cyst removal.
- Avoid swallowing water when swimming. Lakes, streams (and other surface waters) and swimming pools may be contaminated with *Cryptosporidium*, and chlorination is not effective in eliminating the parasite.

ADDITIONAL INFORMATION

A [Cryptosporidiosis Fact Sheet](http://www.state.nj.us/health) can be obtained at the NJDHSS website at <<http://www.state.nj.us/health>>.

The formal CDC surveillance case definition for cryptosporidiosis is the same as the criteria outlined in Section 2 A of this chapter. CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting. When reporting a case to the NJDHSS, always refer to reporting criteria in Section 2 A.

REFERENCES

American Academy of Pediatrics. 2000 Red Book: Report of the Committee on Infectious Diseases, 24th Edition. Illinois, Academy of Pediatrics, 2000.

CDC. Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR. May 2, 1997; 46:RR-10.

CDC. [Cryptosporidiosis](http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/factsht_cryptosporidiosis.htm). Available at http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/factsht_cryptosporidiosis.htm. Updated May 2001.

Chen, XM., Keithly, JS., Paya, CV., LaRusso, N. Cryptosporidiosis. N Engl J Med 2002;346:1723-31.

Chin, J., ed. Control of Communicable Diseases Manual, 17th Edition. Washington, DC, American Public Health Association, 2000.

Massachusetts Department of Public Health, Division of Epidemiology and Immunization. Guide to Surveillance and Reporting. Massachusetts Department of Public Health, Division of Epidemiology and Immunization, January 2001.